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Division of Wildlife Conservation
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Impacts of heavy hunting pressure on the density and demographics of brown bear populations in Southcentral Alaska

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**Annual Research Performance Report
1 July 1999–30 June 2000
Federal Aid in Wildlife Restoration
Grant W-27-3, Study 4.26**

This is a federal aid progress report on continuing research. Information may be refined at a later date.

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RESEARCH PERFORMANCE REPORT

PROJECT TITLE: Impacts of heavy hunting pressure on the density and demographics of brown bear populations in Southcentral Alaska

AUTHOR: Sean Farley

COOPERATORS: NONE

GRANT AND SEGMENT NR.: W-27 3

PROJECT NR.: 4.26

SEGMENT PERIOD: 1 July 1999 – 30 June 2000

WORK LOCATION: Unit 13

STATE: Alaska

I. PROGRESS ON PROJECT OBJECTIVES

Objective 1: **H1. The brown bear population density in the 13A study area is the same as in the remote Su-hydro area in 13E studied in 1985 and 1995.** A CMR conducted in 1997–1998 showed the density of brown bears in the Nelchina study area (13A) to be similar to that of southeastern 13E. A CMR was not performed in 1998–1999, nor in 1999–2000 as not enough time has elapsed from the last census.

Objective 2: **H2. Density of the brown bear population in the 13A study area is the same in 1998 as during subsequent studies.** The CMR conducted in 1997–1998 determined that average densities (# bears/1000km²) for independent bears, bears >2 years old, and all bears were 21.3 (95% CI = 18.3–25.9), 21.3 (18.47–25.6), and 27.49 (25.2–30.7), respectively. Enough time has not elapsed to warrant conducting an additional CMR at this time.

OBJECTIVE 3: **H3. The adult sex ratio and age structure of the brown bear population in the 13A study area is the same as in the remote Su-hydro study area.** In 1997, 25 bears were captured during pre-marking for a CMR, and the sex ratio (combined with 1996 capture data) was found to be 50 males/per 100 females. This was similar to data collected earlier in 13E (42.9 males/100 females).

OBJECTIVE 4: **H4. Productivity of moose populations is independent of changes in bear density.** No work has been done on this objective through this project. Measures of moose population productivity are under investigation by Testa.

OBJECTIVE 5: **H5. Reproductive parameters for bears in the 13A study area are the same as in the remote Su-hydro (13E) area studied between 1980 and 1995.** Survivorship of radiomarked females in 13A (from 1996–1997) was 0.86, compared to a survivorship of 0.79 for

collared females in 13E. However, data from Unit 13E is based upon observations of 298 bears, whereas Unit 13A data is based on 14 females.

OBJECTIVE 6: H6. Determine nutritional value of moose and caribou (calves and adults) to foraging brown bears. We captured 14 adult female bears in the fall of 1999 just prior to den entrance, again in the early spring of 2000 just immediately upon den emergence, and 1 more time approximately 30 days after peak calving. During each capture, body composition was determined by total body water dilution and BIA, blood and hair samples were collected for stable isotope analyses, and fat biopsies were collected for fatty acid analysis. An additional 8 bears with old VHF collars were captured (and recollared with new collars) in the spring of 2000.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1. Estimate brown bear density in an approximate 700 mi² portion of Subunit 13A centered in the area of intensive moose studies (Testa 1994).

No work was done on this job in this period. This work was accomplished in 1997–1998.

JOB 2. Estimate sex ratio and age structure of the brown bear population in the 13A study area and compare to composition of population in 13E study areas and to composition of harvested bears.

No work was done on this job in this period. This work was accomplished in 1997–1998.

JOB 3. Estimate changes in bear productivity and survivorship that may occur in response to heavy hunting pressure.

No work was done on this job in this time period.

JOB 4. Document movements and habitat use of radiomarked bears throughout the period of den emergence during 1996, 1997, and 1998.

No work was done on this job in this period.

JOB 5. Contrast predation rates on neonatal moose calves by radiomarked brown bears with previous results at lower moose densities.

No work was done on this job in this period.

JOB 6. Evaluate prevalence of consumption of moose and caribou by bears through analysis of prey specific fatty acids identified in bears.

Lipid biopsies were collected from adult moose, caribou, and calves of both species for subsequent determination of fatty acid content. No laboratory analyses were performed on these samples during 1999–2000. Federal Aid funds paid the cost of sample collection (\$8,000.00).

JOB 7. Determine body composition changes and diet switching by bears. Stable isotopes and electrical impedance analysis will determine the response of bear body composition as the bears feed upon calves and adults.

Data collected up to 1 July 2000 showed that just prior to entering the den in the fall adult female brown bears had an average body mass of 201.8kg (+/-33.1). This mass was determined to be 29.2% lipid (+/-5.6) and 70.8% lean body mass (+/-5.6). In contrast, upon den emergence the following spring (2000), the average female had a body mass of 130.0 kg (+/-9.6) and carried percent body fat of only 15.1% (+/-4.4). Her lean body content was 84.9% (+/-4.4). We measured these parameters again in the same animals after peak calving and found the average body mass to be 150.1 kg (+/-14.6), the average body fat was determined to have declined to 12.6% (+/-4.1), but the lean body mass had increased to 87.4% (+/-4.1). The nutritional picture emerging from this work, based on last year's data and these data, is that brown bears will continue to lose body lipids until late summer early fall. During the period of peak calving, when bears kill and eat calves, the bears will continue to lose body lipids. Federal Aid funds paid for the cost of bear captures and sample analyses (\$55,000).

JOB 8. Preparation of annual reports and publications.

No publications were written for these data; however, several public seminars of the data were presented, and a poster was composed and drafted. Additional time was spent compiling and analyzing data. Federal aid funds paid for \$12,000.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD:

THERE WAS NO ADDITIONAL FEDERAL AID-FUNDED WORK ON THIS PROJECT.

IV. FEDERAL AID TOTAL PROJECT COSTS FOR THIS SEGMENT PERIOD

\$ _\$75,000_____

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APPROVAL DATE: _____